



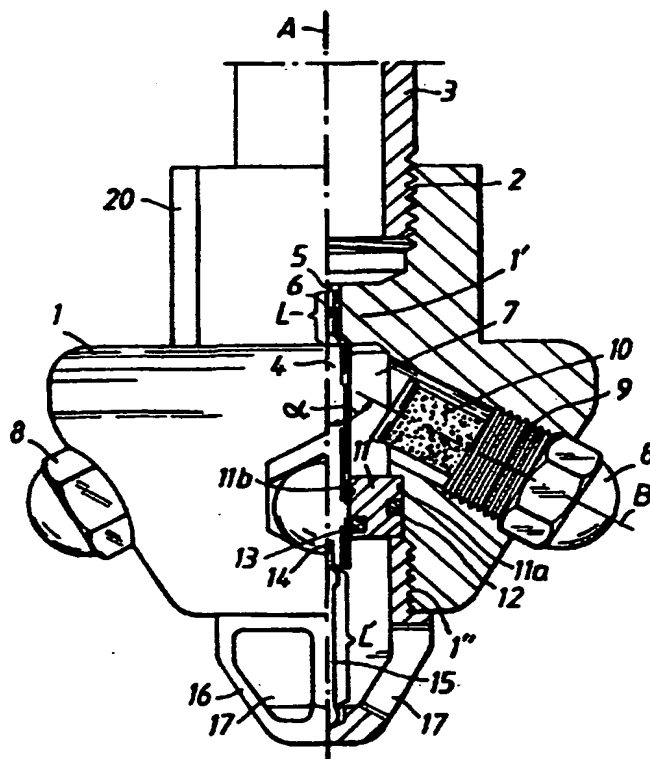
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/SE94/00365 (22) International Filing Date: 25 April 1994 (25.04.94) (30) Priority Data: 9301364-7 23 April 1993 (23.04.93) SE (71) Applicant (for all designated States except US): HTC I ÅMÅL AB [SE/SE]; Box 156, S-662 00 Åmål (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): UNGERTH, Håkan [SE/SE]; Kullens Fyrs Väg 6, S-423 40 Torslanda (SE). (74) Agents: BROLIN, Tommy et al.; Brolin & Sedvall Patentbyrå AB, P.O. Box 7182, S-103 88 Stockholm (SE).		(81) Designated States: AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KG, KP, KR, KZ, LK, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: NOZZLE HOLDER

(57) Abstract

A nozzle holder, in particular a sprinkler head for fire fighting, is provided with a plurality of nozzle fasteners/discharge openings (9) to which sprinkler nozzles (8) may be attached, and with an axially extending valve rod (4) which is supported by a destructible trigger element (15) extending in the direction of an extension of the valve rod. In rest position, one end of the valve rod seals in slidable manner a valve opening (5) in a partition (1') in the nozzle holder, and its other end sealingly passes through a guiding sleeve (11). Around the valve rod there is a chamber (7) which is closed by the partition and by the guiding sleeve and in which all nozzle fasteners discharge. The nozzle fasteners may preferably take at least two different inclinational positions relative to the axis (A) of the nozzle holder by being mounted on settable intermediate members or on exchangeable nozzle holder bodies.



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Nozzle holder

The invention refers to a nozzle holder which is primarily applicable as a spray head for fighting fire and which has a inlet opening, a plurality of outlet openings to which essentially optional spray nozzles may be attached, and a valve rod extending in the axial direction of the spray head and which in the rest position with one its end seals a through-flow opening and on its other end is supported by a destructible trigger element extending in extension of the valve rod. Trigger elements are generally embodied by glass bulbs which are destroyed (burst) at a given elevated temperature.

In particular in sprinkler systems which operate with high pressure water (100 to 200 bars) it is important that the spray heads are kept well sealed as long as the trigger elements are intact, and at the same time that they shall immediately allow full flow after these elements have been destroyed. It is an object of the present invention to provide a suitable construction which meets these demands. Another object of the invention is to provide a nozzle holder in which the water volume discharged from all its nozzles readily can be adapted to different space conditions.

The invention is characterized by the features stated in the enclosed claims, and it will now be described in greater detail with the aid of the enclosed diagrammatical drawing in which

Fig. 1 illustrates, partly in longitudinal section, a first embodiment of the invention,

Fig. 2 illustrates two alternatives of a second embodiment,

Fig. 3 a third, and

Figs. 4a to 4c in half axial sections three alternatives of a fourth embodiment of a nozzle holder according to the invention.

In Figs. 2 and 3 is for clarity not shown the internal construction of the spray heads, which, however, may be the same as in Fig. 1.

According to Fig. 1, the nozzle holder comprises a hou-

sing 1 which is embodied by a single body (the nozzle holder body) and is provided with a threaded inlet opening 2, by means of which it may be screwed-on on a water mains pipe 3 which forms a part of a sprinkler system. The housing 1 is to this purpose provided with gripping elements 20 for a tool, and has otherwise the shape of a truncated cone the envelope surface of which is with a selected angle inclined relative to the axis A of the nozzle holder body. In this envelope surface is a plurality, e.g. six, nozzle seats or fasteners provided which are embodied by threaded outlet openings 9 and in which are spray nozzles 8 essentially of any optional type, and with fine filters 10, screwed-in. The axes B of the spray nozzles 8 subtend the same angle α with the axis A of the housing as the envelope surface.

A solid valve rod 4 is slidably mounted in the housing 1 in axial position. The first end of the valve rod, the upper one in the drawing, is turned toward the inlet opening 2 and is in a slidable and sealing (seal 6) manner guided in a central valve opening 5 which is provided in a partition or intermediate wall 1' in the housing 1. The opposite other end of the valve rod is also in a slidable and sealed (seal 13) manner guided in a central opening 11a in a guide socket 11 which in its turn is in a sealed (seal) 12), but not slidable manner mounted in the housing 1, spacedly from the partition 1'.

Around the valve rod 4, between the partition 1' and the guide socket 11, is a cylindrical space which has a larger diameter than the valve rod 4, so that a cylindrical chamber 7 is obtained there to which all nozzle seats (outlet openings) lead. The guide socket 11 is fixedly mounted in a circular recess or step 11a in the wall of the chamber 7, and is retained therein by a retainer 16 which will be described more in detail later. The guide socket 11 defines the bottom of the chamber 7, beyond which no liquid from the chamber 7 can penetrate. As the valve rod 7 is solid, liquid can neither reach the space beyond the guide socket 11 through the valve rod.

In this space beyond (below in the drawing) the guide socket 11 is a threaded central opening 1" provided in the housing 1, in which the above mentioned nipple-shaped retainer (bulb holder) 16 for a trigger element is screwed-in. The trigger ele-

ment is embodied by a water-filled glass bulb 15 which as defines an extension of the valve rod 4 and rests at its first (in the drawing the upper) end in a means embodied by a recess 14 or the like in the end of the valve rod, more correctly in the front face of the rod at this end. With its other end (the lower one) rests the trigger element in a similar recess in the bulb holder 16. A plurality of holes 17 in the bulb holder 16 give to the surrounding air access to the glass bulb 15.

The valve rod 4, the glass bulb 15, and the bulb holder 16 are so dimensioned, that in the rest position of the spray head, as illustrated in Fig. 1, the first end of the valve rod as a plug completely closes the valve opening 5 in which it is introduced, and the glass bulb 15 is so arranged that it at normal temperature of the surroundings resists the water pressure in the line 3.

The bulb holder 16 can possibly be arranged so that the position in axial direction of the glass bulb 15 and thereby also of the valve rod 4 may be precisely adjusted, e.g. by the recess for the other (lower) end of the glass bulb not being provided directly in the bulb holder itself, but in the front face of a setting screw which is screwed-in in the holder.

When, after the outburst of a fire, the liquid in the glass bulb 15 attains a certain higher temperature, the glass bulb bursts and the valve rod 4 (possibly together with a non-slidably attached guide socket) is by the water pressure in the line 3 pressed out of the valve opening 5, which is thereby made free to allow through-flow. Water from the line 3 can then through the chamber 7 and the nozzle seats 9 with the filters 10 reach the spray nozzles 8.

The cross-sectional area of the valve opening 5 is at least as large as the sum of the cross-sectional areas of all the nozzle openings, and its axial length L is smaller than the axial length L' of the glass bulb 15.

It will be appreciated that e.g. the area which can be reached by water from all the spray nozzles in a sprinkler head depends among other things on the angle α which the spray nozzles, more correctly their axes, subtend with the axis A of the nozzle holder. According to another aspect of the present

invention, the nozzle holder is arranged so that its spray heads may have different inclinations relative to the axis A of the nozzle holder. It is then no longer necessary to stock spray heads of several different types for different uses.

Two solutions are illustrated in Fig. 2. The spray nozzles 8 are not screwed-in immediately in the housing 1, but in intermediate members which are embodied by short articulated pieces of tubing 9" which are screwed-in in the housing and which are of the type available in commerce as "articulated coupling for pressurized air" or "ball coupling for pressurized air", or are embodied by short flexible hoses 9'. The spray nozzles, mounted on the free ends of the intermediate members, defining the nozzle seats, may then be directed as required (generally, all intermediate members will of course be of the same type in one and the same spray head).

According to Fig. 3, the intermediate members are defined by spherical bodies 9a which are provided with a channel 9a' extending along the diameter of the body, and whose outer end defines the nozzle seat. The spherical body 9a is with the aid of a sealing ring 9b' rotationally mounted in the somewhat enlarged orifice of the outlet opening 9, where it is retained by a lock washer 80. The outlet opening 9 is in this instance not threaded.

While the channel 9a' has the same diameter as the outlet opening 90 in the embodiment of Fig. 1, the outlet opening 90 in nozzle holder body 1 has in this embodiment a larger diameter, viz. a diameter which is only slightly smaller than the spherical body 9a. Thereby is obtained that the axis B of the nozzle may occupy every inclined position between the extreme positions B' and B'', i.e. that the nozzle 8 may be swung in horizontal as well as in vertical direction.

The lock washer 80 is provided with a central opening 80' having a diameter which also is somewhat smaller than the diameter of the spherical body 9, and is e.g. as large as the diameter of the outlet opening 90. The lock washer 80 is in the illustrated example retained by three fixing screws 80a which pass through openings 80a' on the lock washer and are screwed-in in the nozzle holder body 1. The fixing screws are released for

adjusting the position of the body 9a, and are tightened to fix the the body 9a in a selected rotational or inclinational position by being pressed against the sealing ring 9b'.

The number of the fixing screws may vary, e.g. the illustrated fixing screw 80a may as a sole screw co-operate with a hook 80b which is shown in dashed lines and which engages the lock washer 80 in the region 80b'.

In the embodiment according to Figs. 4a to 4c the nozzle holder is not made as a single body together with the means for attachment to the water mains (the threaded inlet opening 2 in Fig. 1), but it is divided and comprises a base or an adapter 1a which defines said means of attachment and which for clarity is shown only in Fig. 4a. The adapter is provided with an external thread 21 for attachment of various nozzle holder bodies such as 1b', 1b" or 1b'" etc. with different angles α a', α a", α a'" (30° , 45° , 60° in the illustrated examples).

A readily releasable connection between the adapter and the nozzle holder body may also be achieved in some other manner, e.g. by means of a bayonet fixing.

The nozzle holder bodies 1b', 1b", 1b'" may besides of, or/and instead of, different inclinations also show other variations as to the arrangement of the nozzle seats 9, e.g. different numbers and/or dimensions of the nozzle seats.

The adapter 1a is in conventional manner fastened to the water mains 3 (and possibly also to the wall or the ceiling), and a nozzle holder body which is best suited to the conditions prevailing in the respective space is put on.

Claims

1. Nozzle holder, in particular a spray head for fighting fire, with an inlet which may be connected to a water conduit (3), with a plurality of outlet openings (9) which define nozzle seats for the attachment of spray nozzles (8) provided with nozzle openings, with an axially mounted valve rod (4) and a destructible trigger element (15) extending in extension of the valve rod, the valve rod passing in rest position with its first end, which is turned to the inlet, through a central valve opening in the nozzle holder and sealingly closing the inlet and at its opposed other end being provided with a means (14) for receiving one end of the trigger element, whose other end is supported by a holder (16), and with a cylindrical chamber (7) around the valve rod, in which chamber, below closed by a bottom, all outlet openings debouch, characterized by the valve being solid and the bottom in said chamber being embodied by a guide socket (11) which is unmovably mounted in the wall of the chamber and in which there is a central opening (11a) provided in which the other end of the valve rod is slidably and sealingly guided so that no liquid can penetrate beyond the chamber.

2. Nozzle holder according to claim 1, characterized by the guide socket being inserted in a circular recess (11) in the wall of the said chamber.

3. Nozzle holder according to claim 2, characterized by the recess being defined by a step in the wall of the chamber and the guide socket being retained therein by said holder of the trigger element.

4. Nozzle holder according to one or more of the preceding claims, characterized by the cross-sectional area of the central valve opening being at least as large as the sum of the cross-sectional areas of all the nozzle openings, and its axial length (L) being shorter than the axial length (L') of the trigger element.

5. Nozzle holder, in particular according one of the claims 1 to 4, characterized by the fact that the nozzle seats can occupy at least two different inclinational positions relative to the axis (A) of the nozzle holder by being mounted on adjustable intermediate members (9', 9'') or on exchangeable nozzle

holder bodies (1b', 1b'', 1b''').

6. Nozzle holder according to claim 5, characterized by the intermediate members being embodied by flexible hoses (9').

7. Nozzle holder according to claim 5, characterized by the intermediate members being embodied by articulated pieces of tubing (9'') of the type used in couplings for pressurized air.

8. Nozzle holder according to claim 5, characterized by the intermediate members being defined by a spherical body (9a) with a through-channel (9a'), in the outer orifice of which the nozzle is mounted, and which spherical body in its turn is rotationally mounted in the orifice of the outlet opening on the nozzle holder body and is retained there in desired rotational position by at least one fixing screw (80a) affecting a lock washer (80) with an opening (80') being tightened.

9. Nozzle holder according to claim 8, characterized by the outlet opening in the nozzle holder body and the opening in the lock washer having diameters which are only slightly larger than the diameter of the spherical body.

10. Nozzle holder according to claim 5, characterized by comprising a base or an adapter (1a) for attachment to the water mains (3), and at least two exchangeable nozzle holder bodies (1b', 1b'', 1b'2) differing in the arrangement of the nozzle seats, and which bodies can be sealingly attached to the adapter.

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Fig. 2

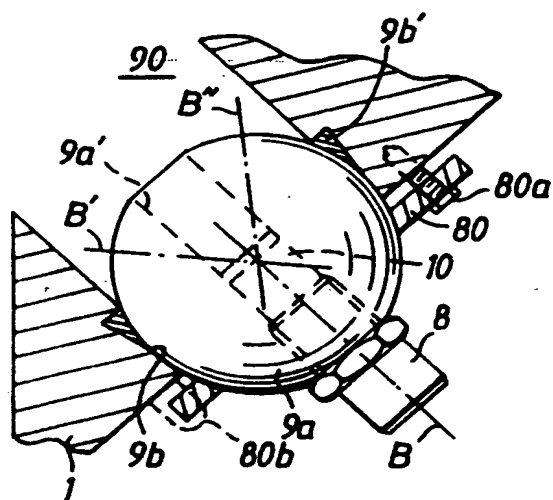
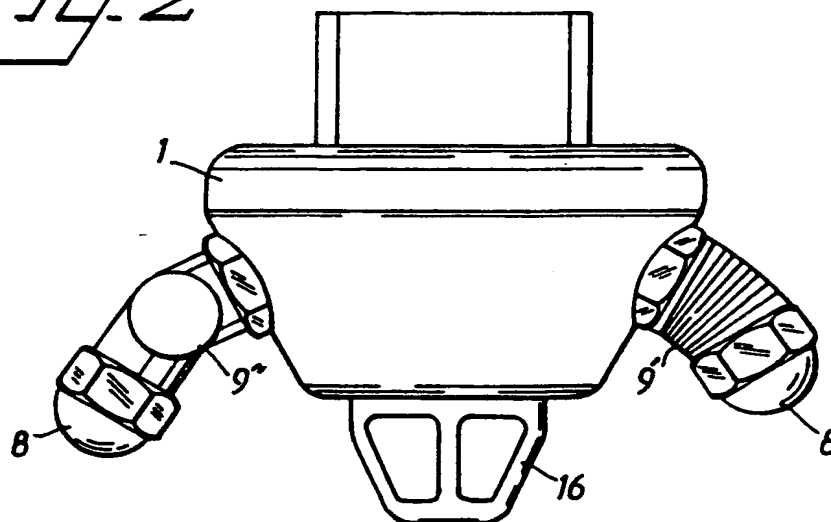
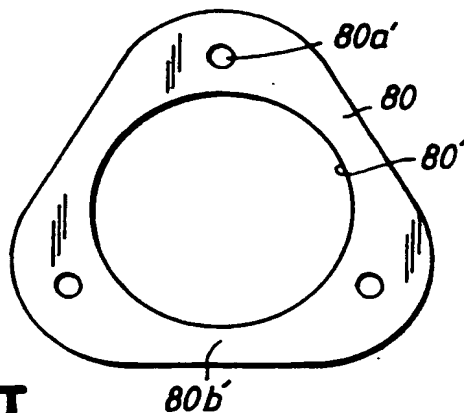


Fig. 3



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Fig. 4a

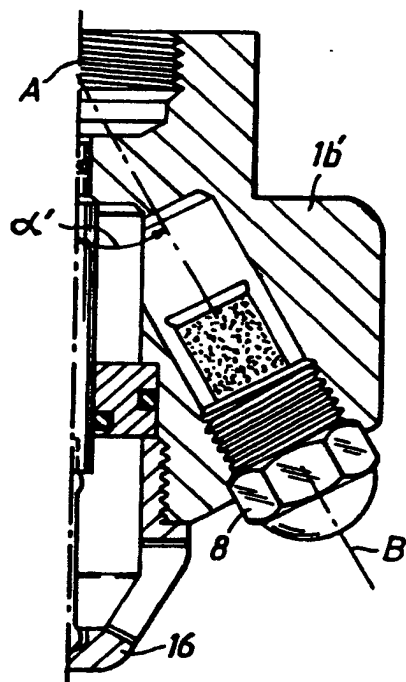


Fig. 4c

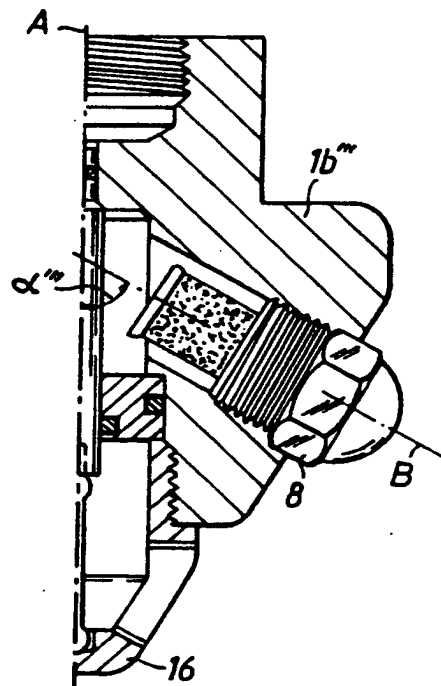
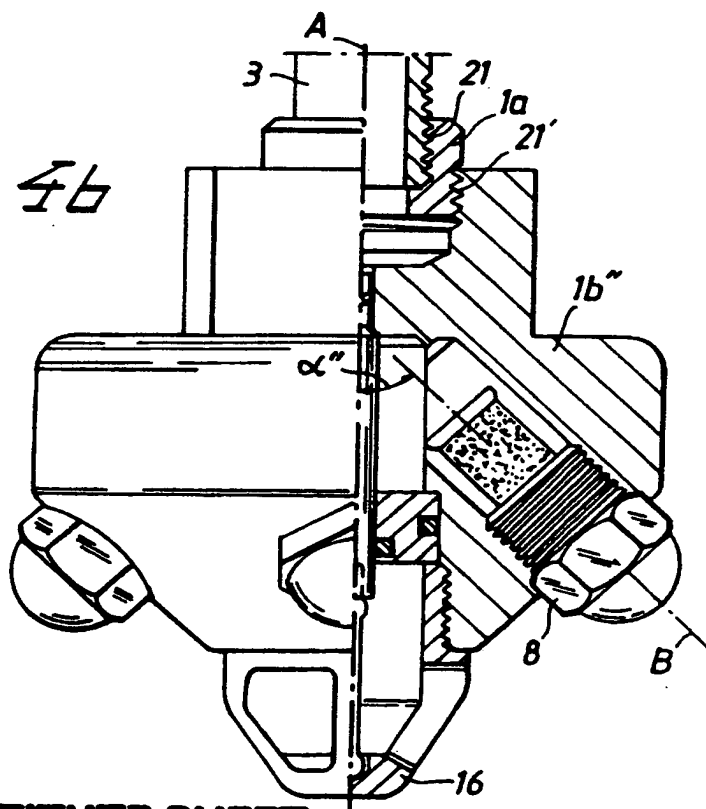


Fig. 4b



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 94/00365

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: A62C 31/05, A62C 37/10, B05B 1/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: B05B, A62C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DIALOG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO, A1, 9215370 (SUNDHOLM, GÖRAN), 17 Sept 1992 (17.09.92), page 6, line 26 - line 30; page 7, line 8 - line 17 --	1
A	US, A, 4434855 (GIVEN, JR.), 6 March 1984 (06.03.84), column 4, line 13 - line 16 --	1
A	GB, B, 298635 (MARIE COUTEN), 7 February 1929 (07.02.29), page 1, line 18 - line 20 -- -----	1

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

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Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO-A1-	9215370	17/09/92	AU-A-	1327192	06/10/92
			BR-A-	9205688	17/05/94
			AU-A-	1971492	12/01/93
			CA-A-	2111232	23/12/92
			EP-A-	0589956	06/04/94
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US-A-	4434855	06/03/84	NONE		
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